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A Modern Housing Solution for 700 million Families in Developing Countries

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Abstract

This paper describes 12 years of research at Universiti Putra Malaysia in collaboration with a practicing architect and a building material entrepreneur. Honeycomb is a town planning concept of interlocking cul-de-sac courtyards. A novel survey was developed to evaluate the consumer acceptance of Honeycomb houses. Honeycomb was preferred by 94% of 1385 respondents in 5 housing surveys across peninsular Malaysia, compared to 6% for equivalent conventional housing. 54% of that preference was 'passionate' about Honeycomb housing compared to only 3% for conventional housing. Honeycomb housing shows great promise as an example for under developed cities across the world.

Keywords: Honeycomb; housing; IBS; affordability; surveys

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1. Introduction

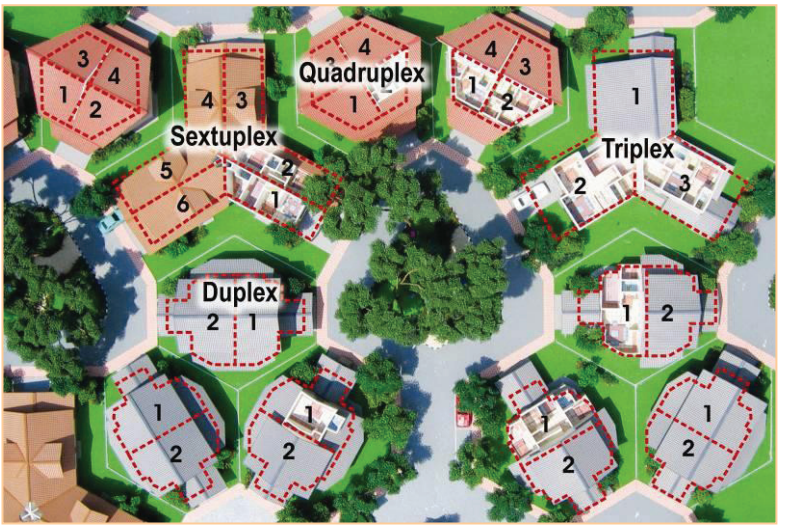

Fig. 1. Honeycomb Housing Concept showing a range of cluster houses facing parks and shady trees. Source: Author, Arkitek M. Ghazali

The post-World War 2 Marshall Plan which rebuilt the homes of war shattered Europe and Japan pointed the way forward to re-house billions in many poorer countries as envisaged in the decolonisation plans of American President Franklin Roosevelt. Australia from the 1960s onwards became an exemplary example of how to provide millions of high quality affordable homes under the concept of a home owning democracy. In the post-war economic boom, Australia was well named then as the 'lucky country'. Young families from Britain, Greece and Italy within 2 years of migrating to Australia could save the deposit to buy a brand new quality apartment or bungalow and soon becomes integrated with a sense of belonging and ownership in their new country. However, a much less optimistic level of thinking had permeated the developing countries. Since the 1960s, environmentalism had resuscitated the discredited Malthusian claims of 19th Century that 'overpopulation' especially in the poor countries was outstripping the limited resources on planet earth and causing environmental catastrophe. A growing international army of green environmental advocates, enjoying comfortable living in high quality modern housing, advocated a far lower standard of housing for the billions in developing countries. In a nut shell, they espoused a no electricity 'mud hut' philosophy. The poor would remain forever poor.

At a national workshop in January 2000 at Universiti Putra Malaysia, "Environment Friendly Townships for Developing Countries", rejected this inhuman conception of mankind and started instead from a universal human need. There was a great human need for about 500 million modern homes, even though this seemed to be mission impossible and was perceived as threatening the environment. The workshop emphasised that every family on earth, if it is to lead a healthy lifestyle, clearly needs a modest home with enough space, electricity, water and sanitation in a pleasant environment with parks, playgrounds, community services and public transport.

The workshop also reported the rapid progress made by our research team from the hard sciences which had united with UPM housing sociologists in designing and building affordable thermal comfort houses on the UPM campus using new industrialised building systems (Davis, et el., 2000). This pioneering work, which introduced attractive and rapidly built houses at prices affordable to the low

income group, had captured the imagination of the public and also the curiosity of all sections of the Malaysian housing industry. Two housing entrepreneurs who shared our views about social housing, Architect Mazlin Ghazali and building materials specialist Chou Kan Yin, the third and fourth authors of this report, informally joined our UPM housing research team as long-term industry collaborators and went on independently inventing Honeycomb housing (Ghazali, 2009) and a Lego-like industrialised building system (Yin, 2009). This loose but highly productive university-industry collaboration have, in a way, revolutionised affordable quality housing in Malaysia. The breakthrough work was published in a 2006 UPM coffee table book, "Thermal Comfort Honeycomb Housing: The Affordable Alternative to Terrace Housing" (Davis, 2006).

Honeycomb housing has undoubtedly made further rapid progress since. By doing away with the socially useless terrace house back lanes, Honeycomb cluster housing is considerably more land efficient, saving costs on roads and services (Figure 1). Higher density housing is then incorporated into Honeycomb cluster house projects. These include three story low-cost Honeycomb apartments above shops lots and 5 storeys medium cost Honeycomb apartment blocks containing 6 or 8 units per floor with a central lift. The overall land use is highly efficient, increases saleable land and reduces infrastructure costs.

Chou's industrialised building system has been fully commercialised and substantially reduces building costs. It is very similar in concept to the Lego building toy and consists of mortar-less load bearing interlocking concrete blocks and steel reinforced concrete floor panels. High quality durable buildings can be constructed in half the time of conventional systems, using 40 per cent less steel (Yin, 2009). Most importantly, Malaysian youth can be readily trained as building workers, and when skilled can earn twice the pay of factory workers. At a stroke, the new system can replace foreign building workers who presently dominated the Malaysian housing industry, by using inefficient low technology, high labour techniques, characterised socially as poorly paid 3D construction, - dull, dirty and dangerous.

The 12 year collaboration of university housing researchers from the hard sciences and social sciences together with innovative entrepreneurs in the housing industry is leading to commercial implementation. Building approvals have been obtained for constructing environment friendly Honeycomb apartments, townhouses and cluster houses in the RM40,000 to RM180,000 price range that 80% of Malaysian income earners can afford. The first commercial Honeycomb housing project has commenced in a prestigious location in Johor Baru, and buyers have snapped up the first phase. More affordable projects around Malaysia are close behind. Developers, when they do their costing, are attracted by the surprisingly higher profit margins for Honeycomb compared to terraces.

Our collaborating housing entrepreneurs had solved the technical aspects of affordable housing in a creative way, by introducing a third generation of Malaysian housing following the traditional rural wooden houses and the concrete urban terrace houses. Measuring the consumer acceptance of Honeycomb housing in Malaysia is the experimental substance of this report. The powerful housing survey method that was developed has direct application in all developing countries.

2. Methodology

The UPM housing survey teams were assigned to test the consumer acceptance of Honeycomb housing, consisted of a housing sociology lecturer and four of his faculty students and ex-students (Figure 2). With official approval, model exhibitions were set up at District Offices and/or supermarkets in 5 locations in Malaysia, namely Kuantan, Johor Baru, Pekan, Sugai Petani and Alor Setar between July 2006 and October 2007.

Fig. 2. Universiti Putra Malaysia Honeycomb Housing Survey Conducted at KOMTUR, Kuantan, 24 -25 July 2006. Source: Author, Universiti Putra Malaysia

2.1. Survey Technique

A 'Purposive' survey was conducted usually at two locations in each town, each for 2 consecutive days. The intention of the preference survey was to attract potential home buyers to view the Honeycomb model and architectural displays of a hypothetical Honeycomb commercial project in the area and compare it with a similarly priced conventional housing project of apartments and terrace houses. After explaining the new housing concept, the passers-by were encouraged to fill out a simple questionnaire designed to 'test the market'. This type of survey is not a random survey but is still a scientific survey, although it cannot be legitimately extended to a larger population. A purposive survey in a shopping centre or a place of work attracts a lot of attention and curiosity from the general public who can immediately view the new housing concept without any commitment. It allows the trained student and graduate enumerators to interact informally with potential respondents, to explain the scientific purpose of the University survey as well as to win their cooperation. This honest and friendly non-intrusive survey technique in a relaxed and comfortable air-conditioned location helps ensure good and reliable data. It can obtain several hundred respondents in a few days from a wide cross section of predominantly the local buying public. It provides a snapshot of the community from which valuable insights can be drawn from a scientific analysis of their responses to a well thought out questionnaire.

2.2. Interview Technique

The Purposive survey was conducted by a team of four students or ex-students from the UPM Faculty of Human Ecology, skilled in consumer survey techniques. Visitors considered old enough to buy houses and passing near the Honeycomb housing exhibition were encouraged to view the Honeycomb housing model and architectural displays by the young and friendly UPM team. After a quick briefing at the mini-exhibition, those whom agreed to be surveyed were asked to select an apartment or house they could afford in 7 price categories, generally in the range from RM40,000 to RM210,000, which included low to medium cost apartments, apartments, medium cost townhouses and a range of double storey cluster houses. Respondents were then shown two matching sets of same priced apartments / houses, honeycomb

versus terrace, at the price they claimed they could afford. Each set of drawings presented the site layout and apartment/house plans with elevations of the appropriately priced Honeycomb apartment or house and the corresponding conventional apartment or house at the same price. After viewing the drawing and the housing models and asking questions seeking clarification, respondents were asked to complete a Malay language questionnaire of 30 simple, tick the box questions. Apart from social demographic questions, or the Honeycomb/Terrace preference question, most questions, or rather statements required ticking the appropriate box in a modified Likert scale:- Strongly agree, Agree, Disagree, Strongly disagree.

The usual 'neither agree nor disagree' choice in the standard 5 point Likert scale was eliminated to force respondents to think about the statement and not take the lazy 'don't know' way out. Respondents encountered almost no problem in answering the 30 or less questions/statements, which were generally completed in around 5 minutes. In general, the total time spent by each respondent in the introduction, briefing at the housing mini-exhibition and answering the questionnaire was 15 to 20 minutes. Often, the respondents at District Offices would take a quick initial briefing, clock on for work and come back when they were free.

The questionnaire was structured to determine the strength of support for Honeycomb apartments and houses compared with same priced terrace housing and conventional apartments. Most of the questions/statements were standard across the different surveys with around 5 flexible ones for the specific aims of each survey. The anonymous questionnaires were checked by the enumerators for any missing data which simplified the statistical analysis. The overall approach by the young, well dressed, polite but energetic survey enumerators was to attract curiosity in the strategically located mini-exhibition, quickly engage those who stopped that this was a university survey to test a new housing concept and encourage the willing cooperation of respondents. This human approach to surveying generated a good response and generally left enumerators and respondents mutually satisfied.

The number of respondents in each survey ranged from 171 in Pekan to 513 in Kuantan which was sufficient for 3 layers of cross tabulation of results.

2.3. Statistical techniques

Back at the university, the responses to the questionnaire statements were punched into a standard SPSS computer program "Statistical Package for the Social Sciences". Frequency tables were prepared, and further cross tabulation analyses were performed within the same statistical package. The frequency tables were further analysed to determine the consumer preference levels of Honeycomb versus terrace housing on a novel 1-10 scoring system from the modified 4 point Likert scale. The response to a statement, for example, 'I like this Honeycomb apartment/house' was allocated the following points:- Strongly Agree 10 points, Agree 7 points, Disagree 4 points, Strongly disagree 1 point. The score of all respondents to the statement was averaged; in this case, it was 8.5 out of 10. We have found this 1 to 10 scoring system to be readily understandable without needing any explanation. The comparative scores are then immediately appreciated. For example, the statement "I like this… house/apartment" in the Johor Baru survey gave a score 8.5 out of 10 for Honeycomb housing and 5.9 for terrace housing, The comparative differences in all statements in the survey were so obvious that further statistical analysis was not required.

A novel scale of consumer preference termed 'the passionate score' was derived from the same data by expressing the number of respondents who 'strongly agreed' with a statement (i.e. were 'passionate') as a percentage of total respondents in that group. This Passionate score on a 1-100 scale is designed to be useful as a scientific marketing tool to judge the psychological strength of consumer support for a new product (i.e. Honeycomb housing) compared with the old product (i.e. Terrace housing). This analysis

permitted further profile analyses (age, race, housing affordability, type of present house, suburb of choice etc.) of respondents who were passionate about Honeycomb housing.

3. Results and Discussion

The summary results of all five UPM housing surveys conducted throughout Peninsular Malaysia from July 2006 to August 2007 are shown in Figure 3. Since our social approach in conducting the University housing survey was to win the confidence of potential home buyers in order to get truthful answers, our student enumerators were able to ask directly which home each respondent could afford in a price range generally from RM40,000 to RM250,000. With this direct method, which did not pry into family income or assets, we were able to determine very easily the housing affordability of a wide range of Malaysians. Based on the responses from 872 respondents in four surveys in public places, all can afford more than RM40,000, showing that the Government low-cost housing program starting with RM25,000 walk up flats is now obsolete. Our interpretation of this surprising finding is that husbands and wives now both work and pool their incomes to increase their housing loan.

The range of new Honeycomb houses and apartments was preferred by 94% of respondents compared to conventional housing. Further analysis to determine the strength of this housing preference revealed that 54% were 'passionate' about Honeycomb housing compared to only 3% for terraces and conventional apartments. We interpret these stunning results, which were obtained throughout Malaysia in Kuantan, Johor Baru, Pekan, Sg. Petani and Alor Setar, as a major breakthrough in housing. Honeycomb cul-de-sac housing, where all houses face a small shady park, safe from traffic and strangers and suitable for even small children, is perceived by the Malaysian population as a highly desirable, modern, urban housing solution, reminiscent of the community spirit of Malay kampungs and small rural towns.

HOUSING AFFORDABILITY

UPM Surveys outside Government Offices

UPM Results (2006-2007) 872 Respondents in 4 surveys

Johor Baru Pekan Sg.Petani Alor Setar

Under RM 40K	0%	*0% of MARKET !*
RM 40K-42K	5%	
RM 50k-90k	43%	*85% of MARKET*
RM 100K-160K	37%	*RM 40K-160k*
RM 170K-190K	6%	*15% of MARKET*
RM 200K-250K	9%	*RM 170K-250K*

Potential Home Buyers

(want to buy new home in 1-5 years)

		Honeycomb	Terrace
Kuantan	*(62%*)*	308	13
Johor Baru	*(69%)*	164	8
Pekan	*(95%)*	152	10
Sg.Petani	*(92%)*	212	23
Alor Setar	*(93%)*	165	16

* *Potential buyers as % of respondents*

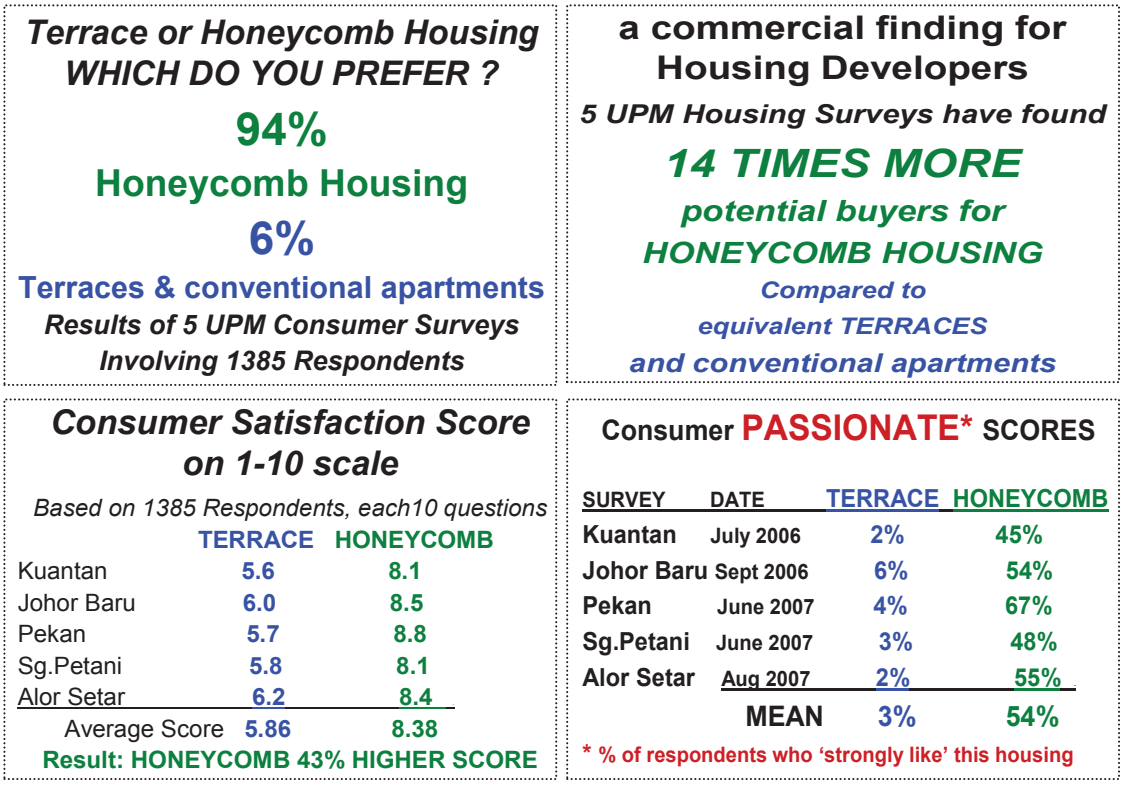

Fig. 3. 6 Slides summarising the 5 Malaysian UPM Housing Surveys between July 2006 and August 2007.

It seems that we have tapped, like cartoonist 'Lat' before us, a deep cultural yearning in the urban population. The urban population is embracing Honeycomb housing for recapturing the happy sense of belonging and the friendliness and security of the traditional rural lifestyle.

4. Conclusions

Malaysia's new Honeycomb housing, in essence, is a scientific urban recreation of the Malay kampung and small rural towns, without the poverty. Our comprehensive Honeycomb housing surveys have given the urban population, to our surprise, a single voice. They are saying loud and clear, "Yes this is the modern urban lifestyle we long for". Honeycomb housing, is therefore, poised to become the third generation of housing in Malaysia, gradually replacing the rather impersonal terrace housing which have become too expensive for the lower 80% of wage earners and the increasingly inhuman high-rise apartments or, still worse, the socially unacceptable low-cost flats that families are forced to live in as the only affordable housing. A large percentage of families end up renting houses and with the increasing price of housing, the dream of owning their own home slips further beyond their grasp.

As housing professionals, we have developed a highly acceptable housing solution comprised of novel cluster houses, townhouses and low-rise apartments that our surveys prove are affordable for every working family in Malaysia, even young married couples and lower paid workers. The scientific and

technological problems have been overcome with new housing inventions, and it is now the task of the rest of society and the government to decide if it will be implemented on a national scale.

We are optimistic that Malaysia's Honeycomb housing will have universal appeal, especially in poor developing countries. There is a brighter future for the billions of poor than the no electricity ethnic housing dictated by the international green environmental movement. Instead, developing nations can leapfrog from medieval rural and urban squatter housing to modern urban housing without being herded into efficiently engineered but inhuman buildings. Honeycomb is not a one size fits all form of housing. It is a highly flexible housing concept that blends into the existing natural and built environment. With the aid of the novel housing survey technique we have pioneered, each developing nation will be able to adapt and modify Malaysian Honeycomb housing to suit its own climate and cultural heritage. A modern home for 700 million families in developing countries is scientifically and technically achievable over the next 50 years and poses no threat whatsoever the earth's environment. Indeed, the real damage to the environment occurs by condemning two thirds of humanity to sub-human housing.

References

Cho Kan Yin (2009) www.tslr.net/2009/05/cheaper-way-to build.html

Mazlin Ghazali (2009) www.tslr.info / www.tslr.net

Mohd Peter Davis, S.Shanmugavelu, Nor Azian Nordin, A.Salam Abdullah, Norizan Yahaya, Wong Sulin and R. Pitt (2000). *A new building system for the construction of thermally comfortable, energy efficient houses in the Malaysian humid tropics.* Workshop Proceedings "Environment Friendly Townships For Developing Countries", p81-86, Universiti Putra Malaysia, Serdang, Selangor, 31 January.

Mohd Peter Davis, Mazlin Ghazali, Nor Azian Nordin (2006) *Thermal Comfort Honeycopmb Housing: The Affordable Alternative To Terrace Housing.* Institute of Advanced Technology, University Putra Malaysia, Serdang, Selangor.